Is domestic private investment sensitive to macroeconomic indicators? Further evidence from Nigeria

Lawrence Boboye AJAYI, Funso Tajudeen KOLAPO

This paper examined the sensitivity of domestic private investment to macroeconomic indicators in Nigeria from 1986 to 2015 using domestic private investment as the dependent variable and gross domestic product, money supply, exchange rate, interest rate and inflation rate as independent variables. The Ordinary Least Square technique, ARDL Modeling technique and the Engle Granger causality technique for analysis revealed that domestic private investment is most sensitive to money supply, gross domestic product as a proxy for economic growth and exchange rate in Nigeria while it is less sensitive to inflation and interest rate in the short run. Gross domestic product as a proxy for economic growth and exchange rate affect domestic private investment positively while money supply has a negative effect in the short run. Domestic private investment is most sensitive to money supply and gross domestic product as a proxy for economic growth in the long run and both exert a negative and positive effect on domestic private investment respectively in the long run while inflation and interest rates also exert significant effect on the same. Meanwhile, the causality test revealed that domestic private investment drives money supply in Nigeria. Hence, it is recommended that monetary policies which relate mostly to the control of the cost, supply/availability and direction of money should be reviewed periodically and ensure that such policies are implemented with little or no lag. Furthermore, the devaluation of the exchange rate which will spur private domestic investment should be cautiously implemented.

Keywords: Domestic private investment, money supply, macroeconomic environment, ARDL model, Nigeria

JEL classification: E22; E52; E62

INTRODUCTION

The need for private investment within an economy has been identified as a booster (propellant) for economic growth. The amount of private domestic investment depends on domestic resource mobilisation which also depends on the macroeconomic environment. Majeed and Khan (2008) posited that countries with high rate of private investment have better economic growth. Oshikoya (1994) argued that private investment performs better and is less likely to be related to corruption even in developed countries. A spurt in private investment usually signals high return on investment in the domestic economy. However, despite these advantages of private investment over other investment types such as public investment and foreign investment, there is a need to provide a conducive macroeconomic environment for private domestic investment in every country to ensure that it significantly contributes to growth.

Investment which exists at two levels is essential to ensure development; while the first level may embrace the public sector investment that involves investment in infrastructure; private investment involves investment by private entities within the economy. However, private investment has been found to contribute more on economic growth than the public investment, in that public investment is seen to be politically motivated most times and lack economic rationality (Kaputo, 2011). For that reason, we cannot compared it to private investment that involves the making of prudent investment decisions.

*Corresponding author: Funso Tajudeen KOLAPO, Department of Finance, Ekiti State University, Ado-Ekiti, Nigeria. Email: realvega1959@gmail.com; Co-Author Email: boblaw2006@yahoo.com
Furthermore, the Endogenous Growth Theory substantiated by Mwega (1997) assume that investment boosts productivity, but investment does not stand-alone; it is very much sensitive to various factors within the macroeconomic sphere of influence. The contributions of domestic private investment (DPI) to economic growth has been emphasised in literature even though more literature exists about foreign direct investment. However, despite the contributions of DPI to economic growth, literature has established that it is sensitive to various macroeconomic factors such as, gross domestic product, money supply and exchange rate within the Nigerian economy. Hence, this study will further contribute to existing body of knowledge from the Nigerian standpoint considering the key macroeconomic indicators that DPI respond to. Furthermore, this study is set to improve on previous studies in Nigeria by adopting the Autoregressive Distributed Lag (ARDL) model and the Granger causality Test to determine the causal relationship among the core macroeconomic indicators which had been established to significantly determine DPI in Nigeria in extant literatures from the developed countries. Also, most contributions in literature has focused on the determinants of private foreign investment which involves the political, technological, global and macroeconomic environment, however, this study will specifically consider the sensitivity of domestic private investment to the macroeconomic environment as there exists a paucity of studies in this regards. Meanwhile, there exist mixed results in literature as regards the sensitivity of domestic private investment to macroeconomic indicators. Recent studies (Esuabalew, 2014) discovered that it is more sensitive to credit to private sector, while some studies like Bosco and Emerence (2016) revealed that it is more sensitive to economic growth. Hence, it is necessary to further investigate the discourse by relying on macroeconomic indicators which has been identified in theoretical and empirical literatures for which DPI is significantly sensitive to.

**Domestic private investment and the macroeconomic environment**

The simple accelerator theory as put forward by Clark (1971). The basic notion of the accelerator theory assumes that investment is sensitive to the demand conditions which are ever changing and as a result, the net investment is known by a change in the desired output (Esuabalew, 2014). As a result, when income increases, demand follows suit and capital stock coupled with investment responds in the same manner in the economy. Hence, it can be inferred that capital stock increases in line with the level of output in the economy. However, this theory assumes that investment is now a function of the difference between the desired capital stock and the existing stock and also the replacement capital required to replace the worn out existing capital stock (Esuabalew, 2014). Investment is therefore a function of capital stock at present time, previous period and aggregate demand at present and previous time. However, according to literature as examined by Esuabalew (2014), the theory has been criticised on the grounds that the cost of capital and technology vary and as a result may not allow output have a constant effect on investment.

The idea behind the flexible accelerator model is the fact that the larger the gap between the existing stock of capital and the desired stock of capital, the greater the investment of a firm (Ghura & Goodwin, 2000). This model assumes that firms ordinarily want to close up the gap between the desired stock and the actual capital stock for each period. Hence, the desired stock of capital is a function of the real cost of capital and the level of output to the extent that when these variables change, capital stock also changes (Gujarat & Porter, 2009). In line with the above, Chirinko (1993) posited that the desired capital stock is proportional to the user cost of capital and the output which all depends on the price of capital goods, rate of interest, rate of depreciation and the tax structure.

As much as domestic private investment may contribute to economic growth in various economies across the world, the same is not excluded from being affected by other factors existing within the macroeconomic sphere of the countries considered. Kolapo, Oke and Olaniyan (2018) noted that some fundamental macroeconomic indicators, inter alia, gross domestic product and money supply can influence investors’ investment decisions. Martin and Wasow (1992) posited that domestic private investment are really sensitive to aggregate demand, credit made available in the economy, infrastructure, public investment expenditure.

In the same vein, Kaputo (2011) asserted that a high rate of inflation tends to discourage private savings and investment while a low inflation rate may assist private sector investment by maintaining international competiveness as a high inflation rate points to macroeconomic instability which may negatively affect investment. As regards exchange rate, Chibber and Dailami (1990) assumed that devaluation alters the supply price of capital goods and the price of imported inputs as an increase in such exchange rate will discourage imports and ensure that funds are mobilised for investment and production within the economy. Also, as a result of an improvement in public investment here the environment is conducive for private investment through the availability of energy, transport and communications, private investment is improved (Greene & Viullanueva, 1990).

George-Anakwuru (2017) examined the impact of interest rate on private domestic investment in Nigeria between 1980 and 2015. Using ordinary least square technique, he found real and prime lending rates to be negatively and significantly related to domestic private investment. Diabate (2016) investigated the determinants of domestic private investment between 1970 and 2012 in Cote de Ivoire with the use of the Auto Regressive Distributed Lag Modeling (ARDL) technique, and found that public investment, foreign direct investment and trade are major
determinants of domestic private investment in the short and long runs while gross domestic product and interest rate are insignificant.

Ekpo (2016) examined the determinants of private investment in Nigeria and observed that inflation rate, fiscal deficit, public investment rate, poor infrastructure, institutional factors, political and economic instability have significant influence on domestic private investment. Combey (2016) examined the determinants of private investment in the West African Monetary Zone (WAMZ) between 1995 and 2014 considering private investment as the dependent variable and also using GDP, output gap, interest rate, inflation rate, credit to private sector, government consumption, term of trade, trade openness and political stability as independent variables using the panel data regression technique. It was observed that economic growth and political stability have significant effect on private investment in the long run.

Bosco and Emerence (2016) examined the effect of GDP, Interest rate and inflation on private investment in Rwanda between 1995 and 2009 employing the Error Correction Modelling technique. It was revealed that economic growth significantly affects private investment. Kalu and Onyinye (2015) investigated the empirical link between domestic private investment and economic growth in Nigeria between 1970 and 2012 using Cobb-Douglas model and observed a significant relationship between real gross domestic product and domestic private investment.

Esbalew (2014) examined the determinants of domestic private investment between 2000 and 2012 in six East African nations adopting the pooled OLS regression technique also used domestic private investment as the dependent variable and public investment, inflation, GDP, credit to private sector, financial deepening, interest rate and exchange rate as independent variables. Economic growth and credit to private sector were found to have positive effect on domestic private investment. Ayeni (2014) examined the determinants of private sector investment in Nigeria between 1979 and 2012. The study used private investment as the dependent variable and also used real gross domestic product, interest rate, exchange rate, inflation rate and credit to private sector as independent variables adopting ARDL bound test approach to co-integration and Error Correction Modelling techniques. It was observed that all the macroeconomic variables have no significant effect on private sector investment.

Findings on the effect of macroeconomic indicators and domestic private investment are mixed. George-Anawakuru (2017), Diabate (2016), Combey (2016), Bosco and Emerence (2016), Kalu, and Onyinye (2015), and Esbalew (2014) agreed that macroeconomic variables have positive significant effect on domestic private investment. Ekpo (2016) and Atoyebi et al., (2012) introduced political and macroeconomic instability into their model and also arrived at similar conclusion. While Ayeni (2014) found no significant relationship between macroeconomic variables and private domestic investment, Bakare (2011), adding infrastructure and political instability to his analysis found a significant negative relationship between private domestic investment and macroeconomic variables. This study aims at establishing the state of affairs.

METHODOLOGY

The study used Ordinary Least Square (OLS) technique for short run analysis, the Auto Regressive Distributed Lag (ARDL) and bound testing approach to co-integration to analyse the presence of long run relationship. Also, Engle Granger causality technique was used to test the causal relationships among the variables under investigation. The study used time series data spanning from 1986 through to 2015. The Autoregressive Distributed Lag (ARDL) bounds testing methodology as developed by Pesaran and Shin (1999) has been favoured above the co-integration analysis developed by Engle and Granger (1987) and Johansen and Juselius (1990) due to the low power problems associated with the co-integration analysis. It is used in cases of mixed integration (Shrestha & Chowdhury, 2007). The methodology as developed by Granger (1969) shows whether a change in a variable will cause a change in another variable. Causality can be unidirectional, bidirectional or no relation at all based on the probability value of the F-statistics.
Model specification

The objective of the study is to investigate the sensitivity of domestic private investment to macroeconomic indicators in Nigeria between 1986 and 2015. Hence, the model formulated for the study is adopted from the study of Esuabalew (2014) is stated hereunder:

\[ DPI = f \left( GDP, INFL, MS, EXGR, INTR, \varepsilon \right) \] ........................eq. 1

We restate equation 1 into an econometric model as:

\[ DPI_t = \beta_0 + \beta_1 GDP_t + \beta_2 INFL_t + \beta_3 MS_t + \beta_4 EXGR_t + \beta_5 INTR_t + \epsilon_t \] ........................eq. 2

From the equations, domestic private investment is adopted as the dependent variable while gross domestic product, inflation, money supply, exchange rate and interest rate were used as independent variables.

ANALYSIS AND DISCUSSION OF RESULTS

This segment of the study discusses the analysis and result of the study. Regression analysis was conducted using E-Views 9.

Table 1: OLS short run result
Dependent Variable: DPI

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Stat</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>5.424412</td>
<td>1.272661</td>
<td>4.262260</td>
<td>0.0003***</td>
</tr>
<tr>
<td>INFL</td>
<td>0.103863</td>
<td>0.430912</td>
<td>0.241032</td>
<td>0.8115</td>
</tr>
<tr>
<td>MS</td>
<td>-5.742207</td>
<td>1.243283</td>
<td>-4.618586</td>
<td>0.0001***</td>
</tr>
<tr>
<td>EXGR</td>
<td>1.756271</td>
<td>0.626259</td>
<td>2.804384</td>
<td>0.0096***</td>
</tr>
<tr>
<td>INTR</td>
<td>-1.260035</td>
<td>1.204416</td>
<td>-1.051161</td>
<td>0.3032</td>
</tr>
</tbody>
</table>

Source: Author’s Computation (2018)
*** Implies a 1% level of significance

The results of the Ordinary Least Square technique in Table 1 revealed that domestic private investment is most sensitive to money supply, economic growth and exchange rate in Nigeria while it is less sensitive to inflation and interest rate in the short run as revealed by the p-value attached to each of the variables. The p-values of each of the variables was reportedly less than 1 per cent. Also, gross domestic product, inflation and exchange rate are positively related to domestic private investment whereas money supply and interest rate are negatively related to domestic private investment as shown by their respective coefficients in Table 1. However, economic growth and exchange rate affects domestic private investment positively while money supply has a negative effect on the domestic private investment.

Table 2: ARDL bounds test results
Co-integration result

<table>
<thead>
<tr>
<th>F-Statistics</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.998085**</td>
<td>2.62</td>
<td>3.79</td>
</tr>
</tbody>
</table>

Source: Author’s Computation (2018)
** Implies a 5 per cent level of significance

Hence, it can be deduced from Table 2 that there exists a long run relationship between domestic private investment and macroeconomic indicators. This observation is based on the greater value of the F-statistics attached to the ARDL bound test over the lower- and higher-bound values at 5 per cent of significance level as shown in the Table 2.

Table 3: ARDL long run results
Long run result of the model
Dependent Variable: DPI

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-Efficient</th>
<th>Std. Error</th>
<th>T-Statistics</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>7.363456</td>
<td>2.470203</td>
<td>2.980911</td>
<td>0.0080***</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.246753</td>
<td>0.635751</td>
<td>-0.388128</td>
<td>0.7025</td>
</tr>
<tr>
<td>MS</td>
<td>-7.189170</td>
<td>2.115189</td>
<td>-3.398831</td>
<td>0.0032***</td>
</tr>
<tr>
<td>EXGR</td>
<td>1.045923</td>
<td>0.790707</td>
<td>1.322770</td>
<td>0.2025</td>
</tr>
<tr>
<td>INTR</td>
<td>-2.400895</td>
<td>1.170441</td>
<td>-1.360146</td>
<td>0.1906</td>
</tr>
<tr>
<td>C</td>
<td>-2.797060</td>
<td>11.345178</td>
<td>-0.246542</td>
<td>0.8081</td>
</tr>
</tbody>
</table>

Source: Author’s Computation (2018)
* Implies a 1% level of significance

In Table 3, the ARDL technique revealed that domestic private investment is most sensitive to money supply and economic growth in the long run and both exert a negative and positive effect on domestic private investment respectively in the long run while inflation and interest rate also exert significant effect on the same.

Table 4: Engle Granger Causality Result
Null Hypothesis

| GDP does not Granger Cause DPI | 29 | 0.74313 | 0.3965 |
| DPI does not Granger Cause GDP | 29 | 1.77219 | 0.1947 |
| INFL does not Granger Cause DPI | 29 | 0.20985 | 0.6507 |
| DPI does not Granger Cause INFL | 29 | 0.48151 | 0.4939 |
| MS does not Granger Cause DPI | 29 | 1.07313 | 0.3098 |
| DPI does not Granger Cause MS | 29 | 5.83900 | 0.0230* |
| EXGR does not Granger Cause DPI | 29 | 0.18652 | 0.6694 |
| DPI does not Granger Cause EXGR | 29 | 0.00991 | 0.9215 |
| INTR does not Granger Cause DPI | 29 | 0.06117 | 0.8066 |
| DPI does not Granger Cause INTR | 29 | 2.40089 | 0.1334 |

Source: Author’s Computation (2018)
* Implies a 10% level of significance

Table 4 showed the results of the Engle Granger causality test. The F-statistics and p-value are used to determine the responses between the variables. Findings revealed that a
unidirectional causality exist between domestic private investment and money supply, and causality runs from domestic private investment to money supply as evidenced by the p-value which is less than 10%. Hence, we reject the hypothesis that DPI do not Granger cause MS, however, this is not so for other indicators under investigation. Suffice it to say that DPI in the result provided in the Table 4 has no causal relations with GDP, INFL, EXGR, and INTR as shown by their respective p-values which is greater than 10%.

CONCLUSION AND RECOMMENDATION

The study examined how domestic private investment responds to changes in macroeconomic indicators in Nigeria between 1986 and 2015. The findings revealed that the impact of changes in money supply, economic growth and exchange rate are strong domestic private investment in Nigeria while the inflation and interest rates exert less influence in the short run. Economic growth and exchange rate affect domestic private investment positively while money supply has a negative effect in the short run. Domestic private investment is most sensitive to money supply and economic growth in the long run and both exert a negative and positive effect on domestic private investment respectively in the long run while inflation and interest rate also exert significant effect on the same. Meanwhile, the causality test revealed that domestic private investment causes money supply in Nigeria. Hence, it is recommended that monetary policies which relates mostly to the control of the cost, supply/ availability and direction of money should be reviewed periodically and ensure that such policies are implemented with little or no lag. Furthermore, the devaluation of the exchange rate which will spur private domestic investment should be cautiously implemented. Also, the rate of inflation should be kept under check to ensure that savings and investment are accelerated as an increase in inflation tends to lower the bulk of private domestic investment.

REFERENCES


Department of Economics, University of Zambia, Lusaka.


Accepted 6 April 2018


Copyright: © 2018 Ajayi and Kolapo. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are cited.